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SEARCH REQUEST FORM. Scientific and Technical Information Center - EIC2800 Rev. 12701 This is an experimental format - Please give suggestions of comments to left Hurrison, CP4-PC18, 366-5429. Date 3/20/03 Serial # 10/039, 1/9 Priority Application Date 1/20/02 Your Name 1/21 - 5/10/06 LOWIE Examiner # 77474 AU 28/4 Phone 305-0474 Room 5026 In what format would you like your results? Paper is the default. PAPER DISK EMAIL. If submitting more than one search, please prioritize in order of need. The EIC searcher normally will contact you before beginning a prior art search. If you would like to with a searcher for an interactive search, please notify one of the searchers. O3-20-03 P04:20 IN Where have you searched so far on this case? Circle: USEL DWP EPO Abs IBM TDB Other: 1EEE What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. What types of references would you like? Please checkmark: Primary Refs Nonpatent Literature Other Secondary Refs Foreign Patents Teaching Refs Foreign Patents Teaching Refs Foreign Patents What is the topic, such as the novelty, motivation, utility, or other specific facets defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe topic. Please attach a copy of the abstract and pertinent claims. **Enffu	SEADOU DEOLIEST EO			534	89559
Your Name LAN - SING LOWIE Examiner # 77474 AU 2614 Phone 305-0474 Room 5 26 In what format would you like your results? Paper is the default. PAPER DISK EMAIL If submitting more than one search, please prioritize in order of need. The EIC searcher normally will contact you before beginning a prior art search. If you would like to with a searcher for an interactive search, please notify one of the searchers. O3-20-03 P04:20 IN Where have you searched so far on this case? Circle: USPT DWP EPO Abs JPO Abs IBM TDB Other: 1EEE What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. What types of references would you like? Please checkmark: Primary Refs Nonpatent Literature Other Secondary Refs Foreign Patents Teaching Refs What is the topic, such as the novelty, motivation, utility, or other specific facets defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe to topic. Please attach a copy of the abstract and pertinent claims. A Buffur fully of frond by special gradually grad a notal fully of the pure number of the search formation of the pure number of the num					
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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2002/0197825 A1 Usui et al.

(43) Pub. Date:

Dec. 26, 2002

(54) SEMICONDUCTOR SUBSTRATE MADE OF GROUP III NITRIDE, AND PROCESS FOR MANUFACTURE THEREOF

(76) Inventors: Akira Usui, Tokyo (JP); Masatomo Shibata, Ibaraki (JP); Yuichi Oshima, Ibaraki (JP)

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ARLINGTON, VA 22202

(21) Appl. No.: 10/105,404

Mar. 26, 2002 (22) Filed:

Foreign Application Priority Data (30)

Mar. 27, 2001	(JP)	2001-090148
Oct. 1, 2001	(JP)	2001-305055
	(IP)	

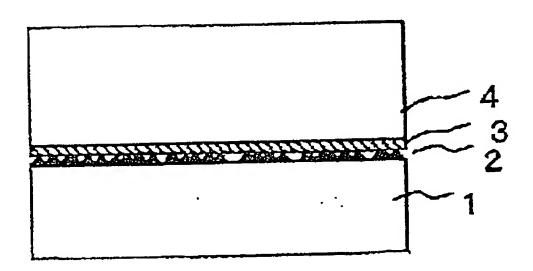
Publication Classification

(51)	Int. Cl.7	
` ,		H01L 31/109; H01L 21/30;
		H01L 31/072; H01L 21/46;
		H01L 21/28; H01L 21/3205
(52)	U.S. Cl.	
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ABSTRACT (57)

To provide a semiconductor substrate of a group III nitride with low defect density and little warp, this invention provides a process comprising such steps of:

forming a GaN layer 2 on a sapphire substrate 1 of the C face ((0001) face); forming a titanium film 3 thereon; heat-treating the substrate in an atmosphere containing hydrogen gas or a gas of a compound containing hydrogen to form voids in the GaN layer 2; and thereafter forming a GaN layer 4 on the GaN layer 2'.



10/038,199

03/20/2003, EAST Version: 1.03.0002

FILE 'REGISTRY' 33 S (IN AND N)/ELS AND 2/ELC.SUB L1 (GA AND N)/ELS AND 2/ELC.SUB L2 46 S 227 S (B AND N)/ELS AND 2/ELC.SUB L3 204 S (AL AND N)/ELS AND 2/ELC.SUB L4 0 S IN/CN L5 0 S INIDIUM/CN L6 1 S INDIUM/CN L7 1 S GALLIUM/CN L8 1 S BORON/CN L9 1 S ALUMINIUM/CN L10 FILE 'HCAPLUS' 5847 S (INDIUM OR IN)(W)(NITRIDE OR N) L11 20095 S (GALLIUM OR GA)(W)(NITRIDE OR N) L12 24575 S (BORON OR B)(W)(NITRIDE OR N) L13 23872 S (ALUMINUM OR AL OR ALUMINIUM)(W)(NITRIDE L14 OR N) 157167 S INDIUM L15 1542518 S GALLIUM OR GA L16 L17 187167 S BORON 1230738 S ALUMINUM OR AL OR ALUMINIUM L18 51943 S (L1 OR L2 OR L3 OR L4). L19 403401 S (L7 OR L8 OR L9 OR L10) L20 6625 S L19 AND L20 L21 117 S L21 AND EPITAX?(W)GROW? L22 17 S L22 AND (BUFFER)(W)(LAYER? OR FILM OR L23 COAT?) 191 S L21 AND (BUFFER)(W)(LAYER? OR FILM OR L24 COAT?) 6 S L24 AND (METAL?)(W)(LAYER? OR FILM OR L25 COAT?) 1 S L22 AND (METAL?)(W)(LAYER? OR FILM OR L26 COAT?) 271 S L21 AND (METAL?)(W)(LAYER? OR FILM OR L27 COAT?) 271 S (L24 OR L27) AND METAL?(W)(LAYER? OR FILM L28 OR COAT?) 6 S L24 AND METAL?(W)(LAYER? OR FILM OR COAT?) L29 L22 AND METAL?(W)(LAYER? OR FILM OR COAT?) 1 S L30

271 S L21 AND METAL?(W)(LAYER? OR FILM OR COAT?)

L32 7 S L31 AND BUFFER

L31

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- L34 191 S L24 AND BUFFER
- L35 3 S L24 AND METAL(W)(NITRIDE OR N)
- L36 2 S L22 AND METAL(W)(NITRIDE OR N)
- L37 15 S L27 AND METAL(W)(NITRIDE OR N)
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- L39 1615 S L38 AND EPITAX?(W)GROW?
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- L41 250 S L39 AND (BUFFER)(W)(LAYER? OR FILM OR COAT?)
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- L43 20 S L41 AND METAL
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599/PN OR WO2002040600/PN OR WO2002067319/PN OR WO2003012841/PN OR WO9731140/PN)

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